

WHAT IS CLAIMED IS:

1. A fuel cell system comprising:

a fuel cell;

5 a gas flow passage for use in at least either of supplying a specific gas to the fuel cell and discharging a discharge gas from the fuel cell;

a water trap, disposed in the gas flow passage, for accumulating water in the gas flow passage, the water trap having a discharge valve for discharging the accumulated water to outside of the gas flow passage;

10 a discharge valve controller for controlling open/close state of the discharge valve;

a pressure measurement unit for measuring a pressure inside the gas flow passage; and

15 a judgment unit for judging whether or not water is accumulated in the water trap based on pressure variation measured by the pressure measurement unit while the discharge valve is being kept open.

2. A fuel cell system according to Claim 1, wherein the judgment unit judges that water is not accumulated in the water trap when the pressure measured by the pressure measurement unit while the discharge valve is being kept open is equal to or less than a predetermined gas-discharge pressure.

25 3. A fuel cell system according to Claim 1, wherein the discharge valve controller can execute a discharge process for discharging the accumulated water in which the discharge valve controller controls the open/close state of the discharge valve so that a judgment (i) that water is not accumulated in the water trap is established by the judgment unit.

30 4. A fuel cell system according to Claim 3, wherein the discharge valve controller has a first discharge process mode that repeats a discharge

operation, in which the discharge valve is opened for a predetermined discharge time and closed after the discharge time, until the judgment (i) is established within the discharge time.

5 5. A fuel cell system according to Claim 4, wherein the discharge valve controller repeats the discharge process in a cyclic period that is longer than a cyclic period of the discharge operation.

10 6. A fuel cell system according to Claim 3, wherein the discharge valve controller has a second discharge process mode that changes the discharge valve from a closed state to an open state and then to a closed state in response to the establishment of the judgment (i).

15 7. A fuel cell system according to Claim 3, wherein the gas flow passage has a circulation path for returning the discharge gas from the fuel cell to the fuel cell again,

and wherein the discharge valve controller judges whether or not an impurity concentration inside the gas flow passage is higher than a predetermined reference concentration according to a specific parameter value related to the impurity concentration inside the gas flow passage, and then executes the discharge process when the impurity concentration is judged to be higher than the reference concentration.

25 8. A fuel cell system according to Claim 7, wherein the discharge valve controller judges that the impurity concentration is higher than the reference concentration when an integrated power generation amount of the fuel cell reaches a predetermined reference integrated power generation amount.

30 9. A method of controlling a fuel cell system including a fuel cell, a gas flow passage for use in at least either of supplying a specific gas to the fuel

cell and discharging a discharge gas from the fuel cell, and a water trap disposed in the gas flow passage for accumulating water in the gas flow passage, the water trap having a discharge valve for discharging the accumulated water to outside of the gas flow passage, the method comprising:

- 5 (a) controlling open/close state of the discharge valve;
- (b) measuring a pressure inside the gas flow passage; and
- (c) judging whether or not water is accumulated in the water trap based on pressure variation measured by the pressure measurement unit while the discharge valve is being kept open.

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10. A method according to Claim 9, wherein the step (c) includes judging that water is not accumulated in the water trap when the pressure measured while the discharge valve is being kept open is equal to or less than a predetermined gas-discharge pressure.

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11. A method according to Claim 9, wherein the step (a) includes executing a discharge process for discharging the accumulated water in which the open/close state of the discharge valve is controlled so that a judgment (i) that water is not accumulated in the water trap is established.

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12. A method according to Claim 11, wherein the step (a) includes executing a first discharge process mode that repeats a discharge operation, in which the discharge valve is opened for a predetermined discharge time and closed after the discharge time, until the judgment (i) is established within the discharge time.

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13. A method according to Claim 12, wherein the step (a) includes repeating the discharge process in a cyclic period that is longer than a cyclic period of the discharge operation.

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14. A method according to Claim 11, wherein the step (a) includes

executing a second discharge process mode that changes the discharge valve from a closed state to an open state and then to a closed state in response to the establishment of the judgment (i).

5 15. A method according to Claim 11, wherein the gas flow passage has a circulation path for returning the discharge gas from the fuel cell to the fuel cell again,

 and wherein the step (a) includes judging whether or not an impurity concentration inside the gas flow passage is higher than a predetermined
10 reference concentration according to a specific parameter value related to the impurity concentration inside the gas flow passage, and executing the discharge process when the impurity concentration is judged to be higher than the reference concentration.

15 16. A method according to Claim 15, wherein the step (a) includes judging that the impurity concentration is higher than the reference concentration when an integrated power generation amount of the fuel cell reaches a predetermined reference integrated power generation amount.